

Ion Chromatography Columns (Anion Analysis)

Features

NI-424 I-524A	<ul style="list-style-type: none"> Ideal for anion non-suppressor methods NI-424 provides simultaneous analysis of fluoride and phosphate ions
SI-90 4E SI-50 4E SI-52 4E	<ul style="list-style-type: none"> Suitable for anion suppressor methods with sodium carbonate eluent Suitable for the quantitative analysis of fluoride ion SI-50 4E separates target inorganic anions from organic acids SI-52 4E provides simultaneous analysis of oxyhalides and general inorganic ions Carbonate peak does not interfere with analysis
SI-35	<ul style="list-style-type: none"> Columns for rapid analysis with suppressor method SI-35 4D provides rapid analysis of oxyhalides and general inorganic ions SI-35 2B provides rapid analysis of general inorganic ions
New SI-36 4D	<ul style="list-style-type: none"> A column using potassium hydroxide as eluent for anion analysis with suppressor method Good separation of sulfite ion / sulfate ion Analysis of seven general inorganic anions within 30 minutes under isocratic conditions

For anion non-suppressor method

● Standard columns

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995243	IC NI-424	≥ 5,000	Quaternary ammonium	5	4.6 x 100	8 mM 4-Hydroxybenzoic acid + 2.8 mM Bis-Tris + 2 mM Phenylboronic acid + 0.005 mM CyDTA aq.
F6709616	IC NI-G	(guard column)	Quaternary ammonium	5	4.6 x 10	8 mM 4-Hydroxybenzoic acid + 2.8 mM Bis-Tris + 2 mM Phenylboronic acid + 0.005 mM CyDTA aq.
F6995240	IC I-524A	≥ 2,000	Quaternary ammonium	12	4.6 x 100	2.5 mM Phthalic acid aq.
F6700400	IC IA-G	(guard column)	Quaternary ammonium	12	4.6 x 10	2.5 mM Phthalic acid aq.

Base Material: Polyhydroxymethacrylate Housing Material: SUS

For anion suppressor method (Sodium carbonate eluent)

● Standard columns

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995244	IC SI-90 4E	≥ 5,000	Quaternary ammonium	9	4.0 x 250	1.8 mM Na ₂ CO ₃ + 1.7 mM NaHCO ₃ aq.
F6709620	IC SI-90G	(guard column)	Quaternary ammonium	9	4.6 x 10	1.8 mM Na ₂ CO ₃ + 1.7 mM NaHCO ₃ aq.
F6995245	IC SI-50 4E	≥ 10,000	Quaternary ammonium	5	4.0 x 250	3.2 mM Na ₂ CO ₃ + 1.0 mM NaHCO ₃ aq.
F6709625	IC SI-50G	(guard column)	Quaternary ammonium	5	4.6 x 10	3.2 mM Na ₂ CO ₃ + 1.0 mM NaHCO ₃ aq.

Base Material: Polyvinyl alcohol Housing Material: PEEK

[For oxyhalides suppressor method]

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995260	IC SI-52 4E	≥ 14,000	Quaternary ammonium	5	4.0 x 250	3.6 mM Na ₂ CO ₃ aq.
F6709626	IC SI-92G	(guard column)	Quaternary ammonium	9	4.6 x 10	3.6 mM Na ₂ CO ₃ aq.

Base Material: Polyvinyl alcohol Housing Material: PEEK

[For rapid analysis]

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995290	IC SI-35 4D	≥ 13,000	Quaternary ammonium	3.5	4.0 x 150	3.6 mM Na ₂ CO ₃ aq.
F6709627	IC SI-95G	(guard column)	Quaternary ammonium	9	4.6 x 10	3.6 mM Na ₂ CO ₃ aq.

Base Material: Polyvinyl alcohol Housing Material: PEEK

● Semi-micro columns

[For rapid analysis]

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995291	IC SI-35 2B	≥ 4,000	Quaternary ammonium	3.5	2.0 x 50	1.0 mM Na ₂ CO ₃ + 2.0 mM NaHCO ₃ aq.

Base Material: Polyvinyl alcohol Housing Material: PEEK

For anion suppressor method (Potassium hydroxide eluent)

● Standard columns

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6999361	New IC SI-36 4D	≥ 8,500	Quaternary ammonium	3.5	4.0 x 150	25 mM KOH aq.

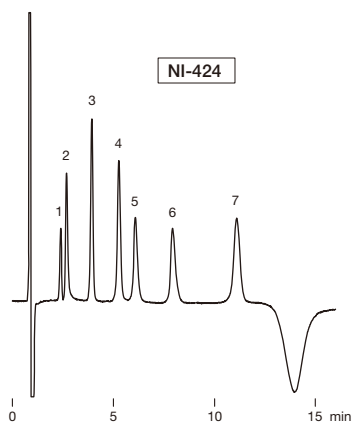
Base Material: Polyvinyl alcohol Housing Material: PEEK

[Guard filter for SI-35 2B]

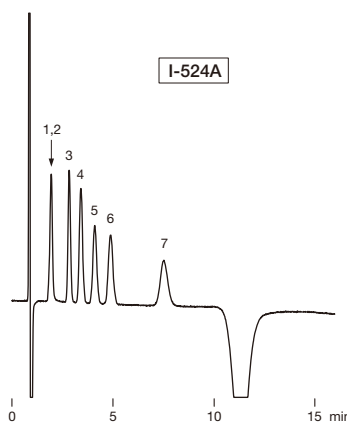
Product Code	Product Name	Contents
F6709720	IC SI-2GF	One holder and one filter
F6709730	IC SI-2GF filter	3 filters

Removes insoluble components in the sample

Anion analysis using NI-424 and I-524A (non-suppressor methods)



Sample : 20 μ L
 1. H_2PO_4^- 10 mg/L
 2. F^- 1 mg/L
 3. Cl^- 1 mg/L
 4. NO_2^- 5 mg/L
 5. Br^- 5 mg/L
 6. NO_3^- 5 mg/L
 7. SO_4^{2-} 5 mg/L



Column : Shodex IC I-524A
 Eluent : 2.5 mM Phthalic acid
 + 2.3 mM Tris(hydroxymethyl)aminomethane aq.
 Flow rate : 1.2 mL/min
 Detector : Non-suppressed conductivity
 Column temp. : 40 $^\circ\text{C}$

With twice increased theoretical plate number, NI-424 provides a higher performance compared to I-524A.

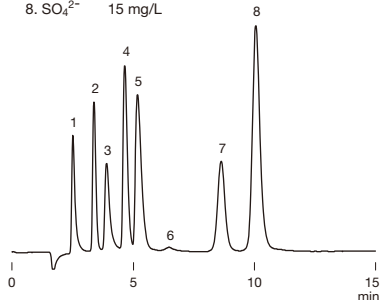
- [Features of NI-424]
 (1) Enables the separation of H_2PO_4^- and F^- which were difficult to separate with I-524A.
 (2) Provides sharper peaks, and resolution between all peaks are well defined. Especially, the separation of Cl^- and NO_2^- is improved.

Column : Shodex IC NI-424
 Eluent : 8 mM 4-Hydroxybenzoic acid + 2.8 mM Bis-Tris
 + 2 mM Phenylboronic acid + 0.005 mM $^*\text{CyDTA}$ aq.
 Flow rate : 1.0 mL/min
 Detector : Non-suppressed conductivity
 Column temp. : 40 $^\circ\text{C}$

$^*\text{CyDTA}$: trans-1,2-Diaminocyclohexane-N,N,N',N'-tetra acetic acid

Anion analysis using SI-90 4E (suppressor method)

Sample : 20 μ L
 1. F^- 2 mg/L
 2. Cl^- 3 mg/L
 3. NO_2^- 5 mg/L
 4. Br^- 10 mg/L
 5. NO_3^- 10 mg/L
 6. HCO_3^- 300 mg/L
 7. HPO_4^{2-} 15 mg/L
 8. SO_4^{2-} 15 mg/L

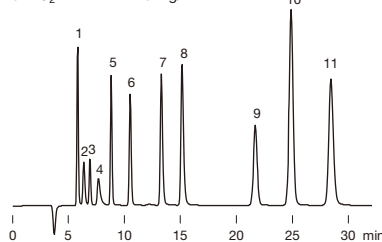


Column : Shodex IC SI-90 4E
 Eluent : 1.8 mM Na_2CO_3 + 1.7 mM NaHCO_3 aq.
 Flow rate : 1.5 mL/min
 Detector : Suppressed conductivity
 Column temp. : Room temp. (25 $^\circ\text{C}$)

Anion analysis using SI-50 4E (suppressor method)

SI-50 4E is a high performance type of SI-90 4E. Acetic acid, formic acid, and methacrylic acid eluted between F^- and Cl^- . The carbonate system peak appears between NO_2^- and Br^- peaks.

Sample : 20 μ L
 1. F^- 2 mg/L
 2. Acetic acid 10 mg/L
 3. Formic acid 2 mg/L
 4. Methacrylic acid 10 mg/L
 5. Cl^- 3 mg/L
 6. NO_2^- 5 mg/L
 7. Br^- 10 mg/L
 8. NO_3^- 10 mg/L
 9. HPO_4^{2-} 15 mg/L
 10. SO_4^{2-} 15 mg/L
 11. Oxalic acid 15 mg/L

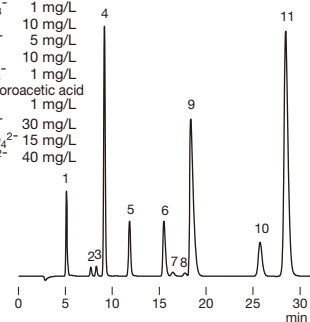


Column : Shodex IC SI-50 4E
 Eluent : 3.2 mM Na_2CO_3 + 1.0 mM NaHCO_3 aq.
 Flow rate : 0.7 mL/min
 Detector : Suppressed conductivity
 Column temp. : 25 $^\circ\text{C}$

Oxyhalides and anions analysis using SI-52 4E (suppressor method)

SI-52 4E is a high resolution column offering 14,000 or higher theoretical plate number. It supports simultaneous analysis of oxyhalides and inorganic anions. It is recommended to set the column temperature at 45 $^\circ\text{C}$.

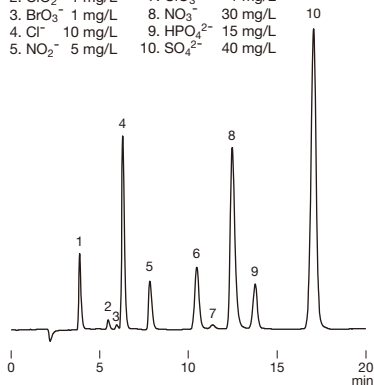
Sample : 50 μ L
 1. F^- 2 mg/L
 2. ClO_2^- 1 mg/L
 3. BrO_3^- 1 mg/L
 4. Cl^- 10 mg/L
 5. NO_2^- 5 mg/L
 6. Br^- 10 mg/L
 7. ClO_3^- 1 mg/L
 8. Dichloroacetic acid 1 mg/L
 9. NO_3^- 30 mg/L
 10. HPO_4^{2-} 15 mg/L
 11. SO_4^{2-} 40 mg/L



Column : Shodex IC SI-52 4E
 Eluent : 3.6 mM Na_2CO_3 aq.
 Flow rate : 0.8 mL/min
 Detector : Suppressed conductivity
 Column temp. : 45 $^\circ\text{C}$

Rapid analysis of oxyhalides and anions using SI-35 4D (suppressor method)

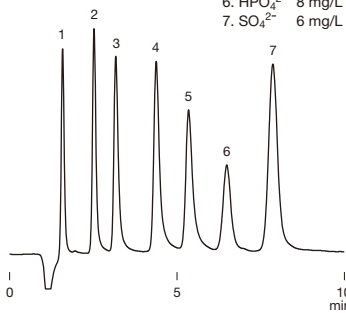
Sample : 20 μ L
 1. F^- 2 mg/L
 2. ClO_2^- 1 mg/L
 3. BrO_3^- 1 mg/L
 4. Cl^- 10 mg/L
 5. NO_2^- 5 mg/L
 6. Br^- 10 mg/L
 7. ClO_3^- 1 mg/L
 8. NO_3^- 30 mg/L
 9. HPO_4^{2-} 15 mg/L
 10. SO_4^{2-} 40 mg/L



Column : Shodex IC SI-35 4D
 Eluent : 2.0 mM Na_2CO_3 +
 4.5 mM NaHCO_3 aq.
 Flow rate : 0.6 mL/min
 Detector : Suppressed conductivity
 Column temp. : 45 $^\circ\text{C}$

Rapid analysis of anions using SI-35 2B (suppressor method)

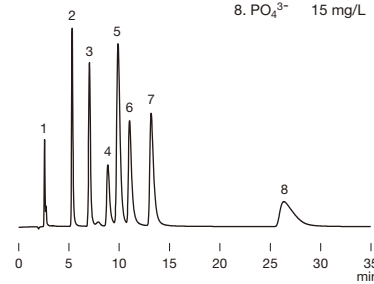
Sample : 2 μ L
 1. F^- 1 mg/L
 2. Cl^- 2 mg/L
 3. NO_2^- 3 mg/L
 4. Br^- 5 mg/L
 5. NO_3^- 5 mg/L
 6. HPO_4^{2-} 8 mg/L
 7. SO_4^{2-} 6 mg/L



Column : Shodex IC SI-35 2B
 Eluent : 1.0 mM Na_2CO_3
 + 2.0 mM NaHCO_3 aq.
 Flow rate : 0.2 mL/min
 Detector : Suppressed conductivity
 Column temp. : 30 $^\circ\text{C}$

Anions and sulfite ion analysis using SI-36 4D (suppressor method)

Sample : 25 μ L
 1. F^- 0.5 mg/L
 2. Cl^- 3 mg/L
 3. NO_2^- 5 mg/L
 4. SO_3^{2-} 5 mg/L
 5. SO_4^{2-} 10 mg/L
 6. Br^- 10 mg/L
 7. NO_3^- 10 mg/L
 8. PO_4^{3-} 15 mg/L



Column : Shodex IC SI-36 4D
 Eluent : 25 mM KOH aq.
 Flow rate : 0.7 mL/min
 Detector : Suppressed conductivity
 Column temp. : 30 $^\circ\text{C}$

Eluent source : Dionex™ EGC 500 KOH

Ion Chromatography Columns (Cation Analysis)

Features

- YS-50**
- High performance type of YK-421
 - Applicable to both suppressor and non-suppressor methods
 - Provides sharp peaks; more significant for divalent cation analysis
 - Supports the analysis of alkylamines and transition metals
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- YK-421**
- Column for cation analysis with non-suppressor method
 - Simultaneous analysis of monovalent and divalent cations
 - Suitable separating of alkylamines
 - Fulfills USP L76 requirements
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- Y-521**
- Column for cation analysis with non-suppressor method
 - Separates monovalent cations or divalent cations
 - Fulfills USP L17 and L22 requirements
-
- T-521**
- Column for transition metal ion analysis
 - Highly sensitive analysis achievable using post column color reaction method
 - Fulfills USP L17 and L22 requirements

● Standard columns

[For cations]

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Base Material	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F7122000	IC YS-50	≥ 5,500	Carboxyl	Polyvinyl alcohol	5	4.6 × 125	H ₂ O
F6700530	IC YS-G	(guard column)	Carboxyl	Polyvinyl alcohol	5	4.6 × 10	H ₂ O
F7120012	IC YK-421	≥ 2,800	Carboxyl	Silica	5	4.6 × 125	5 mM Tartaric acid + 1 mM Dipicolinic acid + 1.5 g/L Boric acid aq.
F6709608	IC YK-G	(guard column)	Carboxyl	Silica	5	4.6 × 10	5 mM Tartaric acid + 1 mM Dipicolinic acid + 1.5 g/L Boric acid aq.
F6995210	IC Y-521	≥ 3,000	Sulfo	Styrene divinylbenzene copolymer	12	4.6 × 150	4 mM HNO ₃ aq.
F6700230	IC Y-G	(guard column)	Sulfo	Styrene divinylbenzene copolymer	12	4.6 × 10	4 mM HNO ₃ aq.

Housing Material: SUS

● Standard columns

[For transition metal ions]

Product Code	Product Name	Plate Number (TP/column)	Functional Group	Particle Size (µm)	Column Size (mm) I.D. x Length	Shipping Solvent
F6995250	IC T-521	≥ 3,000	Sulfo	12	4.6 × 150	3 mM HNO ₃ aq.
F6700412	IC T-G	(guard column)	Sulfo	12	4.6 × 10	3 mM HNO ₃ aq.

Base Material: Styrene divinylbenzene copolymer Housing Material: PEEK

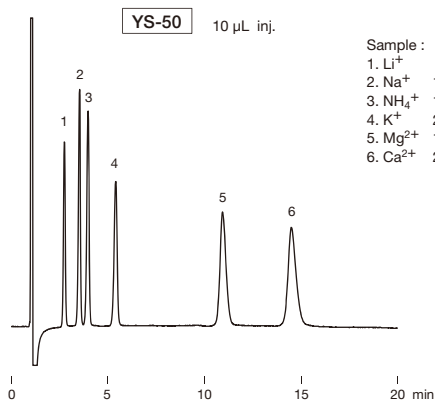
● Line filters for IC

[Shareable for anion analysis and cation analysis]

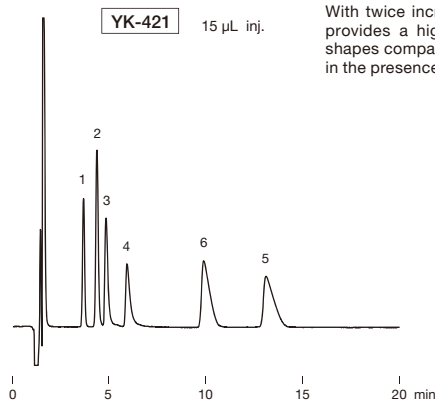
Product Code	Product Name	Contents
F8500630	IC FL-1	One holder and one filter
F8500640	IC FL-1 filter	5 filters

Removes insoluble components in the eluent by installing it upstream of the injector

Cation analysis using YS-50 and YK-421



Column : Shodex IC YS-50
Eluent : 4 mM Methanesulfonic acid aq.
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 40 °C



Column : Shodex IC YK-421
Eluent : 5 mM Tartaric acid + 1 mM Dipicolinic acid + 1.5 g/L Boric acid aq.
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 40 °C

Sample :
 1. Li⁺ 2 mg/L
 2. Na⁺ 10 mg/L
 3. NH₄⁺ 10 mg/L
 4. K⁺ 20 mg/L
 5. Mg²⁺ 10 mg/L
 6. Ca²⁺ 20 mg/L

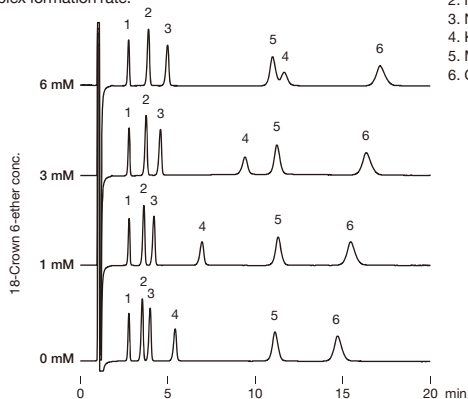
With twice increased theoretical plate number, YS-50 provides a higher performance with improved peak shapes compared to YK-421. The quantitation of NH₄⁺ in the presence of high Na⁺ content is also improved.

TP	YS-50	YK-421
Mg ²⁺	6,900	3,000
Ca ²⁺	6,600	3,000

Resolution (Na ⁺ and NH ₄ ⁺)	YS-50	YK-421
	2.5	2.1

Effects of added crown ether in the eluent

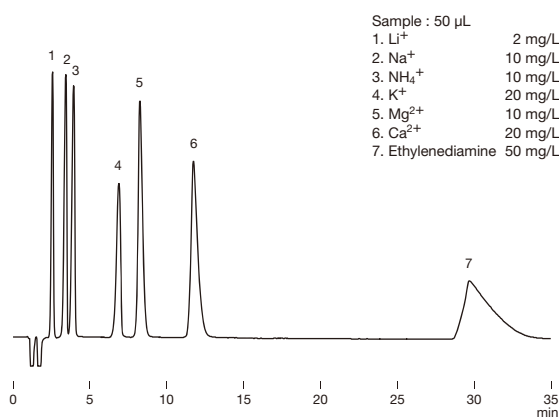
Crown ether forms complex with cations. The elution of cations (particularly K⁺) can be well controlled by the difference in complex formation rate.



Column : Shodex IC YS-50
Eluent : 4 mM Methanesulfonic acid + 18-Crown 6-ether aq.
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 40 °C

Sample : 10 µL
 1. Li⁺ 2 mg/L
 2. Na⁺ 10 mg/L
 3. NH₄⁺ 10 mg/L
 4. K⁺ 20 mg/L
 5. Mg²⁺ 10 mg/L
 6. Ca²⁺ 20 mg/L

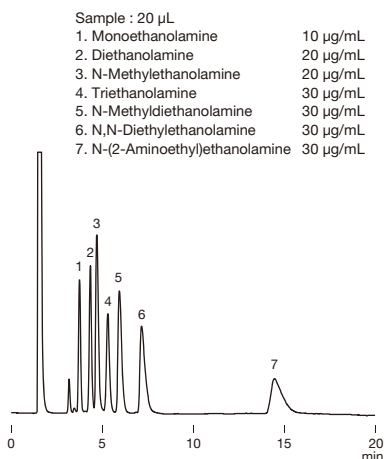
Simultaneous analysis of cations and ethylenediamine



Column : Shodex IC YS-50
Eluent : 4 mM HNO₃ + 1.5 mM 18-Crown 6-ether aq. / CH₃CN=90/10
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 40 °C

Sample : 50 µL
 1. Li⁺ 2 mg/L
 2. Na⁺ 10 mg/L
 3. NH₄⁺ 10 mg/L
 4. K⁺ 20 mg/L
 5. Mg²⁺ 10 mg/L
 6. Ca²⁺ 20 mg/L
 7. Ethylenediamine 50 mg/L

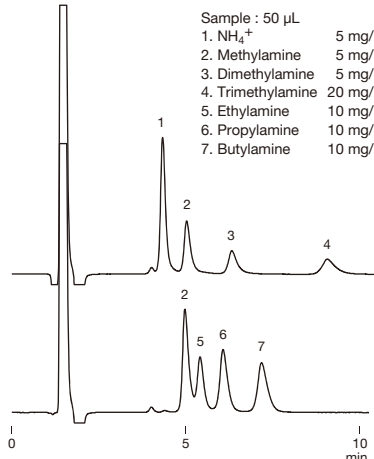
Amino alcohols



Column : Shodex IC YK-421
Eluent : 4 mM HNO₃ aq.
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 40 °C

Sample : 20 µL
 1. Monoethanolamine 10 µg/mL
 2. Diethanolamine 20 µg/mL
 3. N-Methylethanolamine 20 µg/mL
 4. Triethanolamine 30 µg/mL
 5. N-Methyldiethanolamine 30 µg/mL
 6. N,N-Diethylethanolamine 30 µg/mL
 7. N-(2-Aminoethyl)ethanolamine 30 µg/mL

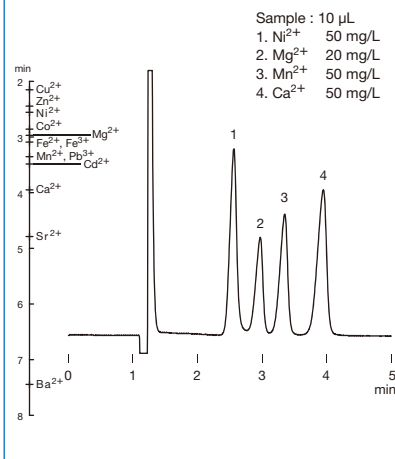
Alkylamines



Column : Shodex IC YK-421
Eluent : 4 mM H₃PO₄ aq./CH₃CN=90/10
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 25 °C

Sample : 50 µL
 1. NH₄⁺ 5 mg/L
 2. Methylamine 5 mg/L
 3. Dimethylamine 5 mg/L
 4. Trimethylamine 20 mg/L
 5. Ethylamine 10 mg/L
 6. Propylamine 10 mg/L
 7. Butylamine 10 mg/L

Alkaline earth metal ions



Column : Shodex IC Y-521
Eluent : 4 mM Tartaric acid + 2 mM Ethylenediamine aq.
Flow rate : 1.0 mL/min
Detector : Non-suppressed conductivity
Column temp. : 40 °C

Sample : 10 µL
 1. Ni²⁺ 50 mg/L
 2. Mg²⁺ 20 mg/L
 3. Mn²⁺ 50 mg/L
 4. Ca²⁺ 50 mg/L